A Preliminary Creel Census and Biological Investigation of Dubawnt Lake, Northwest Territories, 1980

by M. M. Roberge

Western Region
Department of Fisheries and Oceans
Winnipeg, Manitoba R3T 2N6

February, 1984

Canadian Data Report of Fisheries & Aquatic Sciences No. 436

Canadian Data Report of Fisheries and Aquatic Sciences

These reports provide a medium for filing and archiving data compilations where little or no analysis is included. Such compilations commonly will have been prepared in support of other journal publications or reports. The subject matter of Data Reports reflects the broad interests and policies of the Department of Fisheries and Oceans, namely, fisheries management, technology and development, ocean sciences, and aquatic environments relevant to Canada.

Numbers 1-25 in this series were issued as Fisheries and Marine Service Data Records. Numbers 26-160 were issued as Department of Fisheries and the Environment, Fisheries and Marine Service Data Reports. The current series name was changed with report number 161.

The correct citation appears above the abstract of each report.

Rapport statistique canadien des sciences halieutiques et aquatiques

Ces rapports servent de base à la compilation des données de classement et d'archives pour lesquelles il y a peu ou point d'analyse. Cette compilation aura d'ordinaire été préparée pour appuyer d'autres publications ou rapports. Les sujets des Rapports statistiques reflètent la vaste gamme des intérêts et politiques du Ministère des Pêches et des Océans, notamment gestion des pêches, techniques et développement, sciences océaniques et environnements aquatiques, au Canada.

Les numéros 1 à 25 de cette série ont été publiés à titre de Records statistiques, Service des pêches et de la mer. Les numéros 26-160 ont été publiés à titre de Rapports statistiques du Service des pêches et de la mer, Ministère des Pêches et de l'Environnement. Le nom de la série a été modifié à partir du numéro 161.

Le titre exact paraît au haut du résumé de chaque rapport.

Canadian Data Report of
Fisheries and Aquatic Sciences 436

February 1984

A PRELIMINARY CREEL CENSUS AND BIOLOGICAL INVESTIGATION OF DUBAWNT LAKE, NORTHWEST TERRITORIES, 1980

by

M. M. Roberge

Western Region
Department of Fisheries and Oceans
Winnipeg, Manitoba R3T 2N6

This is the 59th Data Report
from the Western Region, Winnipeg

© Minister of Supply and Services Canada 1984

Cat. no. FS 97-13/436 ISSN 0706-6465

Correct Citation for this publication is:

Roberge, M.M. 1984. A preliminary creel census and biological investigation of Dubawnt Lake, Northwest Territories, 1980. Can. Data Rep. Fish. Aquat. Sci. 436: iv + 20 p.

TABLE OF CONTENTS

	Page
ABSTRACT/RESUME	iv
INTRODUCTION	1
STUDY AREA	1
THE FISHERY	1
METHODS AND MATERIALS	1
Creel census	1
Experimental gillnetting	1
Biological sampling	2
Data analysis	2
RESULTS	2
Creel census-Dubawnt Outpost Camp/East	2
Lake trout	2
Arctic grayling	2
Creel census-Dubawnt Trophy Trout Camp/West	2
Lake trout	2
Creel census-Dubawnt Lake	3
Experimental gillnetting	3
Biological investigation	3
Lake trout	3
Round whitefish	3
Burbot	3
ACKNOWLEDGMENTS	3
REFERENCES	3
APPENDICES	17

LIST OF TABLES

Table		Page
1	Summary of information pertaining to outpost operations and creel census survey at Dubawnt Outpost Camp/East and Dubawnt Trophy Trout Camp/West, 1980	5
2	Observed catch, effort and catch/effort statistics by anglers during the creel survey at Dubawnt Lake, 1980	5
3	Summary of harvest statistics for Dubawnt Lake, 1980	5
4	Catch and catch per unit effort (CPE) data for fish caught by experimental gillnets from Dubawnt Lake, 1980	6
5	Biological data by length interval for angled lake trout from Dubawnt Lake, 1980	7
6	Biological data by age group for angled lake trout from Dubawnt Lake, 1980	7
7	Biological data by length interval for lake trout caught by experimental nets from Dubawnt Lake, 1980	8
8	Biological data by age group for lake trout caught by experimental nets from Dubawnt Lake, 1980	9
9	Weight-length relationships, $\log_{10}W = a + b\ (\log_{10}L)$, for each fish species (sexes combined) from Dubawnt Lake, 1959 and 1980	9
10	Fecundity of lake trout from Dubawnt Lake, 1980	10
11	Biological data by length interval for round whitefish caught by experimental nets from Dubawnt Lake, 1980	11
12	Biological data by age group for round whitefish caught by experimental nets from Dubawnt Lake, 1980	11

LIST OF FIGURES

Figure		Page
1	Map of the District of Keewatin, Northwest Territories, showing the locations of sport fishing lodges and outpost camps	12
2	Map of Dubawnt Lake showing the location of the outpost camps	13
3	Map of Dubawnt Lake showing the location of the outpost camps and the major angling areas	14
4	Map of Dubawnt Lake showing the experimental gillnet locations for 1980	15
5	Length and age frequency distributions for lake trout from Dubawnt Lake, 1980	16

LIST OF APPENDICES

Appendix		Page
1	Summary of information on sample dates, sample locations, set duration and catch per unit of effort for experimental gillnet sets on Dubawnt Lake, 1980	17
2	Biological data by length interval for round whitefish caught by experimental nets from Dubawnt Lake, 1959	18
3	Biological data by age group for round whitefish caught by experimental nets from Dubawnt Lake, 1959	18
4	Biological data by length interval for longnose sucker caught by experimental nets from Dubawnt Lake, 1959	19
5	Biological data by age group for longnose sucker caught by experimental nets from Dubawnt Lake, 1959	20

ABSTRACT

Roberge, M.M. 1984. A preliminary creel census and biological investigation of Dubawnt Lake, Northwest Territories, 1980. Can. Data Rep. Fish. Aquat. Sci. 436: iv + 20 p.

In 1980, a preliminary creel census, experimental gillnetting and biological sampling program was carried out on Dubawnt Lake, Northwest Territories. The total angler harvest of lake trout for the 1980 fishing season was estimated to be 572 fish (2 124 kg). Catches were 12.7 fish per angler-day and 1.8 fish per angler-hour. The harvest of lake trout per angler was 7.97 fish (29.50 kg).

Lake trout in Outlet Bay, Dubawnt Lake, comprised 95% of the gillnet catch. Other species caught included round whitefish and burbot. Catch per unit effort (CPE) for lake trout was 13.9 fish per 100 m of gillnet per 24 h.

Angled lake trout from Dubawnt Lake had a mean length of 693 mm, a mean weight of 3 723 g and a mean age of 23.3 years. Lake trout caught by the experimental gillnets had a mean length of 540 mm, a mean weight of 2 469 g and a mean age of 21.3 years. Fecundity was estimated to be 1 030 ova per kg body weight (3 017 ova per female). Sex ratio was 1:0.6 for males: females.

Sexual maturity was first reached at age 11 (375 mm) for males and age 12 (400 mm) for females. Full sexual maturity was attained at age 19 (475 mm) and age 15 (450 mm) for males and females, respectively. Instantaneous total mortality (Z) of lake trout was 0.21.

Key words: angling; catch/effort statistics; experimental gillnetting; lake trout; sport fishing statistics

RESUME

Roberge, M.M. 1984. A preliminary creel census and biological investigation of Dubawnt Lake, Northwest Territories, 1980. Can. Data Rep. Fish. Aquat. Sci. 436: iv + 20 p.

En 1980, on a effectué un relevé préliminaire des prises de pêche sportive, de pêche expérimentale aux filets maillants, et réalisé un programme d'échantillonnage biologique, au lac Dubawnt, dans les Territoires du Nord-Ouest. On a estimé le total des prises de touladis des pêcheurs sportifs pendant la saison de pêche de 1980 à 592 poissons (2 190 kg), dont 8.97 (33.18 kg) touladis par pêcheur sportif. Les prises moyennes se chiffraient à 11.3 poissons par journée de pêche et à 1.8 poissons par heure de pêche.

Dans la baie Outlet du lac Dubawnt, 95% des prises aux filets maillants se composaient de touladis. On a également pêché des ménominis ronds et des lottes. Pour le touladi, les prises par unité d'effort se chiffraient à 13.9 poissons par 100 mètres de filets maillants par 24 heures.

En moyenne, les touladis pêchés à la ligne dans le lac Dubawnt mesuraient 693 mm de long, pesaient 3 723 g et étaient âgés de 23.3 ans, tandis que les touladis pêchés aux filets maillants mesuraient 540 mm de long, pesaient 2 469 g et avaient 21.3 ans. On a estimé leur fécondité à 1 030 oeufs par kg (3 017 oeufs par femelle). Le rapport de masculinité était d'un mâle pour chaque 0.6 femelle.

Les mâles atteignent leur première maturité sexuelle à l'âge de 11 ans (375 mm), alors que les femelles l'atteingnent à 12 ans (400 mm). La pleine maturité sexuelle vient à 19 ans (475 mm) pour les mâles et à 15 ans (450 mm) pour les femelles. Le taux de mortalité instantané (Z) était de 0.21.

Mots-clés: pêche sportive; données prise/effort; pêche expérimentale aux filets maillants; touladi; données sur la pêche sportive à la ligne.

INTRODUCTION

In 1979, the Department of Fisheries and Oceans (DFO) began a five year program to evaluate sport fishing on the major lakes in the District of Keewatin, Northwest Territories, with particular emphasis on lake trout, Salvelinus namaycush (Walbaum). Past studies in the Keewatin District include the Barren Ground Fisheries Survey of inland lakes in the area north of the treeline and west of Hudson Bay conducted by the Fisheries Research Board of Canada in 1959 (Johnson 1976; Moshenko 1980), a commercial gillnetting assessment program conducted by the Department of Fisheries during 1963-1968 as part of an inland lakes survey (Johnson 1976; Moshenko 1980) and a fisheries/ anuatic resources survey of the Keewatin Region conducted during 1972-79 (Bond 1975; Lawrence et al. 1977; Lawrence and Davies 1978; MacDonald and Fudge 1979, MacDonald and Stewart 1980). However, information on lake trout from inland lakes in the district is limited.

The present study was undertaken in response to increased sport fishing lodge development in the district and a proposal from the lodge owners to have the major sport fishery lakes in the area evaluated to determine if they could be designated as "high quality" fishing lakes. The major lakes in the Keewatin under consideration are Kasba, North Henik, South Henik, Dubawnt, Mosquito, Snowbird and Nueltin lakes, all of which have existing or proposed sport fishing lodges (or outposts). It is intended that over the five year period these lakes will be surveyed to gain a better understanding of the sport fishing industry, to obtain lake trout population and harvest data and to assess the potential of these lakes to provide high quality fisheries for lake trout. Results of this program will culminate in a sport fishery management plan for these lakes.

A "high quality fishery" for lake trout is one in which the population structure of lake trout is maintained such that large lake trout are available to anglers on a long-term basis. This is accomplished primarily by allowing very limited exploitation of the stock (i.e. reduced catch and possession limits).

To date there are only two lakes in the Northwest Territories that are managed as high quality fishing lakes and thus have restricted catch and possession limits for lake trout. These are Great Bear and Great Slave lakes. Catch and possession limit for lake trout in both these lakes have been reduced to two and three per angler, respectively and only one lake trout over 700 mm (ca. 4.5 kg) may be retained. All other lakes in the Northwest Territories have at present a catch and possession limit of three and five lake trout. However, some lodges in the Territories have a voluntary lodge policy of reduced catch and possession limits.

In 1980, North Henik and South Henik lakes were selected to be surveyed in this second year of the program, (Roberge and Dahlke In prep.). In addition, a preliminary survey on Dubawnt Lake where an outpost camp of the Henik Lake Lodge is located, was to be undertaken. A voluntary creel census was initiated at the two outpost camps located on the lake by DFO personnel. At the same time experimental gillnetting was conducted in Outlet Bay, Dubawnt Lake by DFO personnel. This data report presents preliminary information on the harvest and biological status of lake trout and other species found to inhabit Dubawnt Lake. Information on the harvest and biological status of lake trout from North Henik and South Henik lakes is presented in Roberge and Dahlke (In prep.).

STUDY AREA

Dubawnt Lake (31°07'N, 101°24'W) is part of the Dubawnt River system and is situated north of the treeline and 430 km northwest of Eskimo Point (Fig. 1). The lake has a maximum length of 111.0 km, a maximum width of 73.3 km, and a total surface area of 383 320 ha. The topography surrounding Dubawnt Lake is typical tundra, a rolling treeless landscape. Surrounding ground cover includes short, dense communities of grasses, sedges, various flowers interspersed with Labrador tea and infrequent bluffs of stunted spruce.

THE FISHERY

Dubawnt Lake has neither a record of being commercially fished, though it has an existing annual quota of 214 000 kg for whitefish and trout, nor of being domestically fished. Sport fishing on Dubawnt Lake commenced in 1977 when a six guest-bed capacity outpost camp (Dubawnt Outpost Camp/East) of the Henik Lake Lodge was established (Fig. 2). A second outpost camp, Dubawnt Trophy Trout Camp/West, was set up on the north portion of Dubawnt Lake with an eight guest-bed capacity in 1979. The areas utilized for sport fishing for lake trout by each outpost camp are depicted in Fig. 3.

MATERIALS AND METHODS

CREEL CENSUS

During 1980, a voluntary creel census was initiated by DFO personnel and conducted by lodge personnel at the Dubawnt Outpost Camp/East and Dubawnt Trophy Trout Camp/West from 13 July to 30 August and 15 July to 12 August, respectively. Anglers were questioned at the end of each day as to the numbers of fish caught, released, retained and eaten for shore lunches by species as well as the hours spent fishing and the locations fished. When possible, the retained catch was sampled for later biological analysis.

EXPERIMENTAL GILLNETTING

Experimental gillnetting was carried out at a number of different locations within the northeast portion of Dubawnt Lake (Outlet Bay) only (Fig. 4). Standard nanos composed of 47.5

m lengths each of 38, 64, 89, 114 and 139 mm mesh (stretched measured) nylon gillnets were used. Catches were recorded by site number, mesh size and species. All fish were sampled for later biological analysis.

BIOLOGICAL SAMPLING

Fish were sampled from the anglers' creel and from gillnets for fork length (±1 mm), round weight (±50 g), aging structures (otoliths/scales), sex, stage of maturity, and stomach contents. Sex and the relative stage of maturity were determined by examination of the gonads and coded according to the stages described by Falk et al. (1982).

Sagittal otoliths were taken from lake trout and burbot and stored dry in coin envelopes. In the laboratory, the otoliths were selectively ground on a carborundum stone and placed in a cleaning solution of 3:1 benzyl-benzoate and methyl salicylate before being read under a binocular dissecting microscope (30x). A reflecting light source against a black background was used to bring out the annual growth zones which were counted to determine the ages. Scales were taken from round whitefish as described by Hatfield et al. (1972) and stored dry in coin envelopes. In the laboratory, scales were placed between glass slides and read with the aid of an Eberbach microprojector (x40).

Ovaries were removed from mature female lake trout collected during the study and placed in a 10% formalin solution. In the laboratory, the ovaries were weighed (wet weight ±1 g) and total number of ova from each ovary were counted after removal of the ovarian tissue. Mean ovum diameter was determined from an average of 20 ova taken from each of the anterior, middle and posterior portions of both ovaries.

DATA ANALYSIS

The Statistical Analysis System (1979) was used to generate length, weight, sex, age and maturity summaries and to perform basic calculations and analysis.

Weight-length relationships were calculated using least squares regression analysis on logarithmic transformations of fork length and round weights. The relationship is described by the following equations:

$$\log_{10} W = a + b (\log_{10} L)$$

where W = weight in grams
L = fork length in centimeters

Relative condition factor (K), a measure of plumpness of a fish, was determined using the formula:

$$K = \frac{W \times 10^5}{L^3}$$

Instantaneous total mortality (Z) was calculated from the least squares regression lines fitted to the descending right hand limb of the catch curves. Moderate fluctuations in recruitment in different year-classes tend to create an irregular shaped catch curve. To reduce these irregularities from unstable recruitment samples from successive years were combined (Ricker 1975). Smoother catch curves were obtained using a running average of three years. Ricker (1975) indicted that the modal age in the catch curve will commonly lie quite close to the first year in which recruitment can be considered effectively complete. Therefore, all age groups older than the modal age were considered fully vulnerable to the gear.

All data were manipulated using the IBM 370/168 computer based at the University of Manitoba, Winnipeg.

RESULTS

CREEL CENSUS - DUBAWNT OUTPOST CAMP/EAST

Dubawnt Outpost Camp/East, an outpost camp of Henik Lake Lodge, is located on Outlet Bay, Dubawnt Lake. In 1980, it operated from 13 July to 30 August (49 days) and accommodated 44 guests (Table 1). A total of 198 angler-interviews were conducted over the operational season.

Lake trout

During the creel census a total of 2 238 lake trout (8 281 kg) were caught (Table 2). Catch per unit effort (CPE) for angled lake trout was 11.3 fish per angler-day (1.6 per angler-hour). The angler caught on the average an estimated 50.9 fish.

Total harvest of lake trout was estimated to be 305 fish (1 129 kg) (Table 3). Harvest per hectare fished was estimated to be 0.01 fish (0.03 kg) while the yield for the entire lake was <0.01 fish (<0.01 kg). The harvest per angler was 6.93 fish (25.66 kg).

Arctic grayling

During the creel census a total of 33 Arctic grayling were caught (Table 2). Catch per unit effort was 0.2 fish per angler-day or <0.01 fish per angler-hour. Total harvest for the season was estimated to be 21 fish. Harvest determined for the fishing area available was <0.01 fish. Harvest per angler was 0.55 fish.

CREEL CENSUS - DUBAWNT TROPHY TROUT CAMP/WEST

In 1980, Dubawnt Trophy Trout Camp/West (Dubawnt Camp/West), located in the northwest end of Dubawnt Lake, operated from 15 July to 12 August (29 days) and accommodated 28 guests (Table 1). A total of 131 angler-interviews were conducted during the fishing season.

Lake trout

During the creel census a total of 1 746 lake trout were caught (Table 2). Catch per unit effort (CPE) for lake trout was 15.1 fish per angler-day or 2.3 fish per angler-hour. The angler caught on the average an estimated 62.4 fish.

Total harvest of lake trout was estimated to be 269 fish (995 kg) (Table 3). Harvest per hectare fished was estimated to be 0.02 fish (0.06 kg) while the yield for the entire lake was <0.01 fish (<0.01 kg). The harvest per angler was 9.61 fish (35.54 kg).

CREEL CENSUS - DUBAWNT LAKE

The fishing pressure exerted on lake trout by the two outpost camps on Dubawnt Lake appears to be similar. The overall catch per unit effort for lake trout is 12.7 fish (47.0 kg) fish per angler-day or 1.8 fish (6.8 kg) per angler-hour (Table 2). Total harvest of lake trout from Dubawnt Lake was 574 fish (2 124 kg) (Table 3). Harvest for available fishing area was <0.01 fish (0.01 kg). Harvest per angler was 7.97 fish (29.50 kg).

EXPERIMENTAL GILLNETTING

During August, seven experimental gillnet sets were made in Outlet Bay only (Fig. 3). A total of 217 fish were caught. The catch (in numbers) was composed of lake trout (95%), round whitefish (5%) and burbot (<1%) (Table 4). Overall catch per unit effort (CPE) was 14.12 fish per 100 m gillnet per 24 h (range = 5.49-36.57 fish per 100 m gillnet per 24 h) (Appendix 1). The value for lake trout was 13.34 CPE and 0.71 CPE for round whitefish.

CPE for lake trout from Dubawnt Lake is similar to that found for lake trout from North Henik and South Henik lakes (11.5 and 10.8 CPE, respectively), (Roberge and Dahlke In prep.) and Kasba Lake (14.0 CPE) (Falk et al. 1982).

BIOLOGICAL INVESTIGATION

Lake Trout

Mean length of angled (retained only) lake trout from Outlet Bay, Dubawnt Lake was 693 mm (range = 414-763 mm) (Table 5), mean weight was 3 723 g (range = 700-4 660 g) and mean age was 23.3 years (range = 14-34 years) (Table 6). Lake trout caught in the experimental gillnets had a mean length of 540 mm (range = 173-957 mm) (Table 7), a mean weight of 2 469 g (range = 50-8 400 g) and a mean age of 21.3 years (range = 5-52 years) (Table 8). The length and age frequency distributions for lake trout caught in the experimental gillnets are depicted in Fig. 5.

The weight-length relationship for lake trout from Dubawnt Lake (Table 9) is described by the following functional regressions:

$\log_{10} W = -5.1546 + 3.057 (\log_{10} L)$ (angled)
$\log_{10} W = -5.0654 + 3.039 (\log_{10} L)$ (gillnetted)

The relative condition factor (K) was estimated to be 1.13 for males and 1.10 for females.

The ratio of males to females for lake trout caught by the experimental gillnets was 1:0.6. Sexual maturity was first reached at age 11 (375 mm) for males and age 12 (400 mm) for females. Full sexual maturity was attained at age 19 (475 mm) for males and age 15 (450 mm) for females.

The average number of ova per female was 3 017 ova (Table 10). Fecundity for lake trout was estimated to be 1 030 ova per kg body weight.

Instantaneous total mortality (Z) was estimated to be 0.21 (S = 0.81) for lake trout from Outlet Bay.

Round whitefish

A total of 11 round whitefish were caught in the experimental gillnets. The mean fork length was 357 mm (range = 227-515 mm) (Table 11), mean weight was 459 g (range = 100-750 g) and mean age was 8.5 years (range = 5-12 years) (Table 12). Information on weight-length relationship is given in Table 9. Condition factors were 1.10 for males and 0.82 for females.

Burbot

One burbot was caught in the experimental gillnets with a fork length of 250 mm, a weight of 50 g and a condition factor of 0.32.

ACKNOWLEDGMENTS

The author wishes to thank the owners of the Dubawnt Outpost Camp/East and Dubawnt Trophy Trout Camp/West and their staff for their assistance in the data collection. Assistance in the field was provided by L. Dahlke; and in the lab by L. Dahlke and C. J. Read. S. Ahlgren typed the final report. J.T. Strong and R.W. Moshenko reviewed the report and provided critical comments and useful suggestions.

REFERENCES

BOND, W.A. 1975. Data on the biology of lake whitefish and lake trout from Kaminuriak Lake, District of Keewatin, N.W.T. Can. Fish. Mar. Serv. Data Rep. Ser. CEN/D-75-4: 27 p.

FALK, M.R., L.W. DAHLKE, and M.M. ROBERGE. 1982. Creel census and biological investigation, with particular reference to lake trout, Salvelinus namaycush, on Kasba Lake, 1979. Can. Manuscr. Rep. Fish. Aquat. Sci. 1642: v + 45 p.

HATFIELD, C.T., J.N. STEIN, M.R. FALK, and C.S. JESSOP. 1972. Fish resources of the Mackenzie River Valley. Environ. Can. Fish. Serv. Interim Rep. Vol. I: 247 p.

JOHNSON, L. 1976. Ecology of Arctic populations of lake trout, Salvelinus namaycush, lake whitefish, Coregonus clupeaformis, Arctic char, S. alpinus, and associated species in unexploited lakes of the Canadian Northwest Territories. J. Fish. Res. Board Can. 33: 2459-2488.

LAWRENCE, M., and S. DAVIES. 1978. Anuatic resources survey - Keewatin and Franklin Districts. Can. Dept. Indian North. Affairs. ESCOM Report AI-31: xiii + 108 p.

LAWRENCE, M., S. DAVIES, G. COLLINS, F. HNYTKA, K. KROEKER, and R. SIE. 1977. A survey of anuatic resources of the District of Keewatin and Boothia Peninsula. Can. Dept. Indian North. Affairs. ESCOM Report AI-07: 357 p.

MacDONALD, G., and R. FUDGE. 1979. A survey of fisheries resources of the Kazan Upland (southeastern District of Mackenzie, southern District of Keewatin, N.W.T.). Arctic Land Use Research Program 1978. Environmental Studies No. 11 Canada Dept. Indian and North. Affairs: 160 p.

MacDONALD, G., and D.B. STEWART. 1980. A survey of anuatic resources of the Central Keewatin Region of Northwest Territories. Arctic Land Use Research Program 1979. Environmental Studies No. 17 Canada Dept. Indian and North. Affairs: 111 p.

MOSHENKO, R.W. 1980. Biological data of the maior fish species from fifty-nine inland lakes in the Northwest Territories, 1959-1968. Can. Data Rep. Fish Anuat. Sci. 175: viii + 91 p.

RICKER, W.E. 1975. Computation and interpretation of biological statistics of fish populations. Fish Res. Board Can. Bull. 191: xviii + 382 p.

ROBERGE, M.M., and L. Dahlke (In prep.). Creel census and biological information on North Henik Lake and South Henik Lake, Northwest Territories, with particular reference to lake trout, Salvelinus namaycush. (Title provisional) Can. Manuscr. Rep. Fish. Anuat. Sci.

STATISTICAL ANALYSIS SYSTEM. 1979. Raleigh State University, Raleigh, N.C.

Table 1. Summary of information pertaining to outpost operations and creel survey at Dubawnt Outpost Camp/East and Dubawnt Trophy Trout Camp/West, 1980.

Location	Lodge Operation: Period	Duration (days)	No. of Guests: Calculated	No. of Guests: License Sales[1]	Angler-days	Creel Census: Period	Duration (days): Total	Duration (days): Censused	No. Anglers	Angler-days	Angler-hours
Dubawnt Outpost Camp/East	13 July - 30 August	49	44	NA[2]	198	14 July 30 August	49	47	44	198	1 416
Dubawnt Trophy Trout Camp/West	15 July - 12 August	29	28	47	116	15 July - 12 August	29	29	28	116	760[3]

[1] Provided by Dept. Renewable Resource, Government of Northwest Territories.
[2] Not available - included in license sales for Henik Lake Lodge (Roberge and Dahlke In prep).
[3] Value calculated from Dubawnt Outpost Camp/East.

Table 2. Observed catch, effort and catch/effort statistics by anglers during the creel survey at Dubawnt Lake, 1980.

Location	Species	Catch: No.	Catch: Wt(kg)	Angler effort: days	Angler effort: hours	Fish per angler: No.	Fish per angler: Wt(kg)	Fish per angler-day: No.	Fish per angler-day: Wt(kg)	Fish per angler-hour: No.	Fish per angler-hour: Wt(kg)
Dubawnt Lake East	lake trout	2 238	8 281	198	1 416	50.9	188.2	11.3	41.8	1.6	5.9
	Arctic grayling	33	-			0.9	-	0.2	-	<0.1	-
Dubawnt Lake West	lake trout	1 746	-	116	760[1]	62.4	-	15.1	-	2.3	-
Dubawnt Lake	lake trout	3 984	14 741[1]	314	2 176	55.3	204.7	12.7	47.0	1.8	6.8
	Arctic grayling	33	-			0.5	-	0.1	-	<0.1	-

[1] Value calculated from Dubawnt Outpost Camp/East.

Table 3. Summary of harvest statistics for Dubawnt Lake, 1980.

Location	Species	Census Harvest[1]: No.	Census Harvest[1]: Wt(kg)	Total Harvest[2]: No.	Total Harvest[2]: Wt(kg)	Harvest per Hectare fished: No.	Harvest per Hectare fished: Wt(kg)	Harvest per Hectare available: No.	Harvest per Hectare available: Wt(kg)	Harvest per Angler: No.	Harvest per Angler: Wt(kg)
Dubawnt Lake (East)	lake trout	152	562	305	1 129	0.01	0.03	<0.01	<0.01	6.93	25.66
	Arctic grayling	20	-	21	-	-	-	<0.01	-	0.55	-
Dubawnt Lake (West)	lake trout	158	-	269	995[3]	0.02	0.06	<0.01	<0.01	9.61	35.54
Dubawnt Lake	lake trout	310	1 147	574	2 124[3]	0.01	0.04	<0.01	0.01	7.97	29.30
	Arctic grayling	20	-	21	-	-	-	<0.01	-	0.32	-

[1] Includes fish retained and shore lunches.
[2] Includes fish retained, shore lunches and release mortality.
[3] Mean weight = 3.7 kg. calculated from Dubawnt Outpost Camp (East).

Table 4. Catch and catch per unit effort (CPE) data for fish caught by experimental gillnets from Dubawnt Lake, 1980.

		Mesh Size 1.5 (38 mm)	2.5 (64 mm)	3.5 (89 mm)	4.5 (114 mm)	5.5 (139 mm) (in)	Total Catch (kg)	CPE[1]
Lake trout	No.	58	54	49	30	15	206	13.34
	%	28.2	26.2	23.8	14.6	7.3	94.9	
Round whitefish	No.	3	7	1	-	-	11	0.71
	%	27.3	63.6	9.1	-	-	5.1	
Burbot	No.	-	-	1	-	-	1	<0.06
	%	-	-	100.0	-	-	<0.1	
Total	No.	61	61	51	30	15	218	14.12

[1] No. fish caught/100 m gillnet/24 hours.

Table 5. Biological data by length interval for angled lake trout from Dubawnt Lake, 1980.

Length Interval (mm)	MALES N	%	Mean Fork Length (mm)	Weight(g) Mean	SD	K	% Mat.	FEMALES N	%	Mean Fork Length (mm)	Weight(g) Mean	SD	K	% Mat.	COMBINED N	%	Mean Fork Length (mm)	Weight(g) Mean	SD	K	% Female
400	2	18	414	700	0	0.99	0	-	-	-	-	-	-	-	2	18	414	700	0	0.99	0
725	4	36	745	4063	214	0.98	100	-	-	-	-	-	-	-	4	36	745	4063	214	0.98	0
750	5	45	763	4660	204	1.05	100	-	-	-	-	-	-	-	5	45	763	4660	204	1.05	0
TOTAL	11						82	-						-	11						0
MEAN			693	3723	1531	1.02				-	-	-	-				693	3723	1531	1.02	

Table 6. Biological data by age group for angled lake trout from Dubawnt Lake, 1980.

Age (yr)	MALES N	%	Fork Length(mm) Mean	SD	Weight(g) Mean	SD	K	% Mat.	FEMALES N	%	Fork Length(mm) Mean	SD	Weight(g) Mean	SD	K	% Mat.	COMBINED N	%	Mean Fork Length (mm)	Weight(g) Mean	SD	K	% Female
14	1	9	422	-	700	-	0.93	0	-	-	-	-	-	-	-	-	1	9	422	700	-	0.93	0
15	1	9	406	-	700	-	1.05	0	-	-	-	-	-	-	-	-	1	9	406	700	-	1.05	0
19	2	18	757	12	4350	71	1.01	100	-	-	-	-	-	-	-	-	2	18	757	4350	71	1.01	0
22	1	9	749	-	4000	-	0.95	100	-	-	-	-	-	-	-	-	1	9	749	4000	-	0.95	0
23	1	9	747	-	4150	-	1.00	100	-	-	-	-	-	-	-	-	1	9	747	4150	-	1.00	0
25	1	9	755	-	4600	-	1.07	100	-	-	-	-	-	-	-	-	1	9	755	4600	-	1.07	0
26	1	9	766	-	4950	-	1.10	100	-	-	-	-	-	-	-	-	1	9	766	4950	-	1.10	0
28	1	9	734	-	3800	-	0.96	100	-	-	-	-	-	-	-	-	1	9	734	3800	-	0.96	0
31	1	9	764	-	4600	-	1.03	100	-	-	-	-	-	-	-	-	1	9	764	4600	-	1.03	0
34	1	9	763	-	4750	-	1.07	100	-	-	-	-	-	-	-	-	1	9	763	4750	-	1.07	0
TOTAL	11							82	-							-	11						0
MEAN			693	138	3723	1531	1.02				-	-	-	-	-				693	138	3723	1531	1.02	
MEAN AGE	23.3								-								23.3						

Table 7. Biological data by length interval for lake trout caught by experimental nets from Dubawnt Lake, 1980.

Length Interval (mm)	MALES							FEMALES							COMBINED						
	N	%	Mean Fork Length (mm)	Weight(g) Mean	SD	K	% Mat.	N	%	Mean Fork Length (mm)	Weight(g) Mean	SD	K	% Mat.	N	%	Mean Fork Length (mm)	Weight(g) Mean	SD	K	% Female
150	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	0	173	50	-	0.97	0
175	1	1	187	75	-	1.15	0	4	5	190	56	13	0.82	0	6	3	190	58	13	0.85	67
200	4	3	206	140	80	1.64	0	4	5	218	100	0	0.97	0	10	5	214	116	51	1.24	40
225	4	3	237	125	29	0.93	0	2	3	233	150	0	1.19	0	7	3	236	136	24	1.03	29
250	2	2	263	200	0	1.10	0	-	-	-	-	-	-	-	2	1	263	200	0	1.10	0
275	3	3	293	267	29	1.06	0	4	5	292	275	29	1.10	0	7	3	292	271	27	1.09	57
300	3	3	308	268	55	0.91	0	1	1	300	300	-	1.11	0	4	2	306	276	48	0.96	25
325	1	1	330	350	-	0.97	0	1	1	335	350	-	0.93	0	2	1	333	350	0	0.95	50
350	1	1	353	500	-	1.14	0	-	-	-	-	-	-	-	1	0	353	500	-	1.14	0
375	2	2	379	650	71	1.19	100	3	4	381	583	76	1.05	0	5	2	380	610	74	1.11	60
400	3	3	409	667	76	0.97	33	2	3	412	850	0	1.22	50	5	2	410	740	114	1.07	40
425	7	6	433	964	189	1.18	86	1	1	428	850	-	1.08	0	8	4	433	950	179	1.17	13
450	11	9	461	1255	123	1.28	91	3	4	469	1267	76	1.23	100	14	7	463	1257	112	1.27	21
475	8	7	492	1381	194	1.16	100	8	10	491	1356	145	1.14	100	16	8	492	1369	166	1.15	50
500	10	8	517	1675	140	1.21	100	11	14	512	1550	157	1.16	100	21	10	514	1610	159	1.18	52
525	5	4	534	1760	248	1.15	100	9	12	543	1917	168	1.20	100	14	7	540	1861	206	1.18	64
550	6	5	562	1742	307	0.98	100	4	5	555	1988	206	1.16	100	10	5	559	1840	288	1.05	40
575	1	1	598	2600	-	1.22	100	2	3	588	1925	318	0.95	100	3	1	591	2150	450	1.04	67
600	-	-	-	-	-	-	-	1	1	602	2450	-	1.12	100	1	0	602	2450	-	1.12	100
625	1	1	635	2700	-	1.05	100	-	-	-	-	-	-	-	1	0	635	2700	-	1.05	0
650	3	3	667	3250	173	1.09	100	1	1	670	2850	-	0.95	100	4	2	668	3150	245	1.06	25
675	1	1	677	3800	-	1.22	100	-	-	-	-	-	-	-	1	0	677	3800	-	1.22	0
700	7	6	715	3921	325	1.07	100	-	-	-	-	-	-	-	7	3	715	3921	325	1.07	0
725	7	6	736	4250	240	1.07	100	4	5	731	4263	232	1.09	100	11	5	734	4255	225	1.08	36
750	7	6	765	4757	629	1.06	100	3	4	759	4300	577	0.98	100	10	5	764	4620	622	1.04	30
775	6	5	789	5208	341	1.06	100	2	3	789	5000	141	1.02	100	8	4	789	5156	309	1.05	25
800	1	1	823	6000	-	1.08	100	-	-	-	-	-	-	-	1	0	823	6000	-	1.08	0
825	6	5	840	6617	942	1.12	100	3	4	835	6633	153	1.14	100	9	4	838	6622	748	1.12	33
850	3	3	863	7517	777	1.17	100	2	3	868	7050	919	1.08	100	5	2	865	7330	760	1.13	40
875	2	2	877	8050	71	1.19	100	1	1	892	7300	-	1.03	100	3	1	882	7800	436	1.14	33
900	2	2	907	7850	212	1.05	100	-	-	-	-	-	-	-	2	1	907	7850	212	1.05	0
925	1	1	935	8500	-	1.04	100	-	-	-	-	-	-	-	1	0	935	8500	-	1.04	0
950	1	1	957	8400	-	0.96	100	-	-	-	-	-	-	-	1	0	957	8400	-	0.96	0
TOTAL	120						81	76						73	201						38
MEAN			569	2770	2379	1.13				516	2154	2182	1.10				540	2469	2321	1.11	

Table 8. Biological data by age group for lake trout caught by experimental nets from Dubawnt Lake, 1980.

Age (yr)	MALES N	%	Mean Fork Length(mm) Mean	SD	Weight(g) Mean	SD	K	% Mat.	FEMALES N	%	Mean Fork Length(mm) Mean	SD	Weight(g) Mean	SD	K	% Mat.	COMBINED N	%	Mean Fork Length (mm)	Weight(g) Mean	SD	K	% Female
5	-	-	-	-	-	-	-	-	2	3	193	4	50	0	0.70	0	3	1	186	50	0	0.79	67
6	4	3	208	18	94	13	1.06	0	4	5	205	21	94	43	1.03	0	11	5	208	91	28	0.99	36
7	4	3	233	14	125	29	0.99	0	3	4	219	4	100	0	0.95	0	8	4	229	119	26	0.99	38
8	2	2	232	45	230	42	1.84	0	2	3	266	46	225	106	1.16	0	4	2	249	228	66	1.66	50
9	-	-	-	-	-	-	-	-	1	1	295	-	300	-	1.17	0	1	0	295	300	-	1.17	100
10	3	3	285	20	250	50	1.07	0	2	3	287	0	250	0	1.06	0	5	2	286	250	35	1.07	40
11	7	6	343	48	436	207	1.02	43	1	1	335	-	350	-	0.93	0	8	4	342	426	194	1.01	13
12	2	2	392	54	625	177	1.04	50	5	6	381	49	650	226	1.13	20	7	3	384	643	199	1.11	71
13	4	3	412	67	913	485	1.18	50	3	4	420	45	850	350	1.10	33	7	3	416	886	400	1.14	43
14	9	8	450	17	1167	115	1.22	89	-	-	-	-	-	-	-	-	9	4	458	1167	115	1.22	0
15	4	3	436	20	1038	345	1.22	75	2	3	475	12	1250	141	1.18	100	6	3	449	1108	296	1.21	33
16	7	6	508	109	1671	1178	1.15	86	5	6	499	11	1380	164	1.11	100	12	6	504	1550	888	1.13	42
17	-	-	-	-	-	-	-	-	3	4	495	10	1500	0	1.24	100	3	1	495	1500	0	1.24	100
18	-	-	-	-	-	-	-	-	5	6	522	25	1680	335	1.17	100	5	2	522	1680	335	1.17	100
19	3	3	534	25	1667	301	1.10	100	1	1	545	-	2050	-	1.27	100	4	2	537	1763	312	1.14	25
20	8	7	544	58	1925	775	1.16	100	2	3	577	35	2125	460	1.10	100	10	5	551	1965	705	1.14	20
21	12	10	686	104	3654	1439	1.07	100	4	5	576	107	2275	1223	1.13	100	16	8	658	3309	1482	1.08	25
22	6	5	646	120	3275	1448	1.16	100	3	4	495	21	1433	202	1.18	100	9	4	596	2661	1473	1.17	33
23	2	2	714	73	3850	990	1.05	100	3	4	546	3	1850	100	1.14	100	5	2	613	2650	1204	1.10	60
24	2	2	749	49	4375	1237	1.03	100	4	5	564	71	2138	545	1.19	100	6	3	626	2883	1349	1.14	67
25	3	3	668	113	3417	1314	1.12	100	2	3	638	127	3000	1485	1.12	100	5	2	656	3250	1211	1.12	40
26	5	4	546	74	1910	703	1.15	100	1	1	563	-	2250	-	1.26	100	6	3	549	1967	644	1.17	17
27	2	2	593	170	2350	1626	1.05	100	2	3	550	52	1775	530	1.05	100	4	2	571	2063	1042	1.05	50
28	1	1	837	-	6100	-	1.04	100	-	-	-	-	-	-	-	-	1	0	837	6100	-	1.04	0
29	1	1	840	-	6750	-	1.14	100	-	-	-	-	-	-	-	-	1	0	840	6750	-	1.14	0
30	1	1	738	-	4300	-	1.07	100	-	-	-	-	-	-	-	-	1	0	738	4300	-	1.07	0
31	2	2	679	161	3500	2546	1.00	100	2	3	669	115	3025	1874	0.93	100	4	2	674	3263	1845	0.97	50
32	2	2	721	221	5050	4172	1.18	100	-	-	-	-	-	-	-	-	2	1	721	5050	4172	1.18	0
33	2	2	660	87	3450	1202	1.18	100	3	4	759	182	5250	2965	1.09	100	5	2	719	4530	2394	1.13	60
34	2	2	649	157	3750	2616	1.25	100	1	1	519	-	1550	-	1.11	100	3	1	606	3017	2244	1.20	33
35	3	3	698	145	3700	2052	1.03	100	2	3	763	46	4825	389	1.09	100	5	2	724	4150	1588	1.05	40
36	1	1	714	-	4050	-	1.11	100	1	1	757	-	3700	-	0.85	100	2	1	736	3875	247	0.98	50
39	1	1	823	-	6000	-	1.08	100	1	1	873	-	7700	-	1.16	100	2	1	848	6850	1202	1.12	50
40	2	2	822	63	6575	2227	1.16	100	2	3	780	64	5425	1520	1.13	100	4	2	801	6000	1693	1.14	50
41	2	2	852	35	7075	1450	1.14	100	1	1	782	-	4900	-	1.02	100	3	1	829	6350	1621	1.10	33
42	-	-	-	-	-	-	-	-	1	1	771	-	4850	-	1.06	100	1	0	771	4850	-	1.06	100
43	2	2	861	105	6650	2616	1.01	100	1	1	863	-	6400	-	1.00	100	3	1	862	6567	1856	1.01	33
44	3	3	910	48	7683	917	1.02	100	-	-	-	-	-	-	-	-	3	1	910	7683	917	1.02	0
45	1	1	843	-	5400	-	0.90	100	-	-	-	-	-	-	-	-	2	1	845	6100	990	1.01	50
46	1	1	863	-	7750	-	1.21	100	-	-	-	-	-	-	-	-	1	0	863	7750	-	1.21	0
47	1	1	846	-	7700	-	1.27	100	1	1	1027	-	11550	-	1.07	100	2	1	937	9625	2722	1.17	50
50	1	1	902	-	7700	-	1.05	100	-	-	-	-	-	-	-	-	1	0	902	7700	-	1.05	0
52	1	1	846	-	7700	-	1.27	100	-	-	-	-	-	-	-	-	1	0	846	7700	-	1.27	0
TOTAL	119							81	76							73	201						38
MEAN			570	200	2781	2386	1.13				516	193	2154	2187	1.10				540	2474	2325	1.11	
MEAN AGE	22.3								20.8								21.3						

Table 9. Weight-length relationships, $\log_{10} W = a + b (\log_{10} L)$, for each fish species (sexes combined) from Dubawnt Lake, 1959 and 1980.

Species	N	Y-intercept (a)	Slope (b)	Standard Dev. of b (S_b)	95% C.I.
Lake trout					
angled	11	-5.1546	3.057	0.072	2.913-3.201
gillnetted	202	-5.0654	3.039	0.026	2.988-3.110
Round whitefish	11	-4.2598	3.698	0.320	2.050-3.338
Longnose sucker (1959)	46	-5.2758	3.151	0.031	3.089-3.213
Round whitefish (1959)	69	-5.9285	3.360	0.074	3.212-3.508

Table 10. Fecundity of lake trout from Dubawnt Lake, 1980.

Date	Fork Length (mm)	Weight (g)	Mean Ovum Diameter (mm)	Total Ovum Count
9 August	500	1650	5.3	2916
9 August	545	2250	5.1	2309
10 August	548	1850	5.1	2378
10 August	503	1650	5.1	1856
11 August	554	2050	4.9	2816
11 August	847	6800	5.4	6867
12 August	730	4550	5.2	2702
12 August	548	1950	5.1	2863
12 August	485	1500	5.3	1716
13 August	468	1200	4.8	1482
13 August	727	4050	5.7	2737
13 August	795	5100	4.7	5570
13 August	733	4100	4.8	6237
13 August	735	4350	5.6	4457
13 August	563	2250	5.2	3983
13 August	472	1250	4.8	1858
14 August	587	2150	5.5	1712
14 August	519	1850	5.2	2329
14 August	494	1500	5.3	1434
15 August	825	6500	5.7	4254
Mean	609	2928	5.2	3017

Table 11. Biological data by length interval for round whitefish caught by experimental nets from Dubawnt Lake, 1980.

Length Interval (mm)	Males							Females							Combined						
	N	%	Mean Fork Length (mm)	Weight (g) Mean	SD	K	% Mat.	N	%	Mean Fork Length (mm)	Weight (g) Mean	SD	K	% Mat.	N	%	Mean Fork Length (mm)	Weight (g) Mean	SD	K	% Female
220	1	13	227	100	-	0.85	0	-	-	-	-	-	-	-	1	9	227	100	-	0.85	0
290	1	13	294	200	-	0.79	0	-	-	-	-	-	-	-	1	9	294	200	-	0.79	0
310	1	13	312	300	-	1.11	0	-	-	-	-	-	-	-	1	9	312	300	-	1.11	0
320	-	-	-	-	-	-	-	1	33	327	400	-	1.14	0	1	9	327	400	-	1.14	100
340	1	13	343	450	-	1.12	0	-	-	-	-	-	-	-	1	9	343	450	-	1.12	0
350	1	13	356	450	-	1.00	0	-	-	-	-	-	-	-	1	9	356	450	-	1.00	0
360	2	25	366	525	-	1.07	0	-	-	-	-	-	-	-	2	18	366	525	-	1.07	0
400	-	-	-	-	-	-	-	1	33	402	600	-	1.02	0	1	9	402	600	-	0.92	100
410	1	13	419	750	-	1.02	0	-	-	-	-	-	-	-	1	9	419	750	-	1.02	0
510	-	13	-	-	-	-	-	1	33	515	750	-	0.55	0	1	9	515	750	-	0.55	100
Total	8							3							11						
Mean			335	413	-	1.10	0			415	583	-	0.82	0			357	459	-	1.01	27

Table 12. Biological data by age group for round whitefish caught by experimental nets from Dubawnt Lake, 1980.

Age (yr)	Males								Females								Combined						
	N	%	Mean Fork Length (mm) Mean	SD	Weight (g) Mean	SD	K	% Mat.	N	%	Mean Fork Length (mm) Mean	SD	Weight (g) Mean	SD	K	Mat.	N	%	Mean Fork Length (mm)	Weight (g) Mean	SD	K	% Female
5	1	13	227	-	100	-	0.85	0	-	-	-	-	-	-	-	-	1	10	227	100	-	0.85	0
7	2	25	303	-	250	-	0.90	0	1	50	327	-	400	-	1.14	0	3	30	311	300	-	1.00	33
8	1	13	356	-	450	-	1.00	0	-	-	-	-	-	-	-	-	1	10	356	450	-	1.00	0
9	2	25	353	-	475	-	1.08	0	-	-	-	-	-	-	-	-	2	20	353	475	-	1.08	0
10	1	13	368	-	550	-	1.10	0	-	-	-	-	-	-	-	-	1	10	368	550	-	1.10	0
11	-	-	-	-	-	-	-	-	1	50	515	-	750	-	0.55	-	1	10	515	750	-	0.55	100
12	1	13	419	-	750	-	1.02	0	-	-	-	-	-	-	-	-	1	10	419	750	-	1.02	0
Total	8								2								10						
Mean			335	-	413	-	1.10	0			421	-	575	-	0.77	0			352	445	-	1.02	20
Mean age		8.4								9.0								8.5					

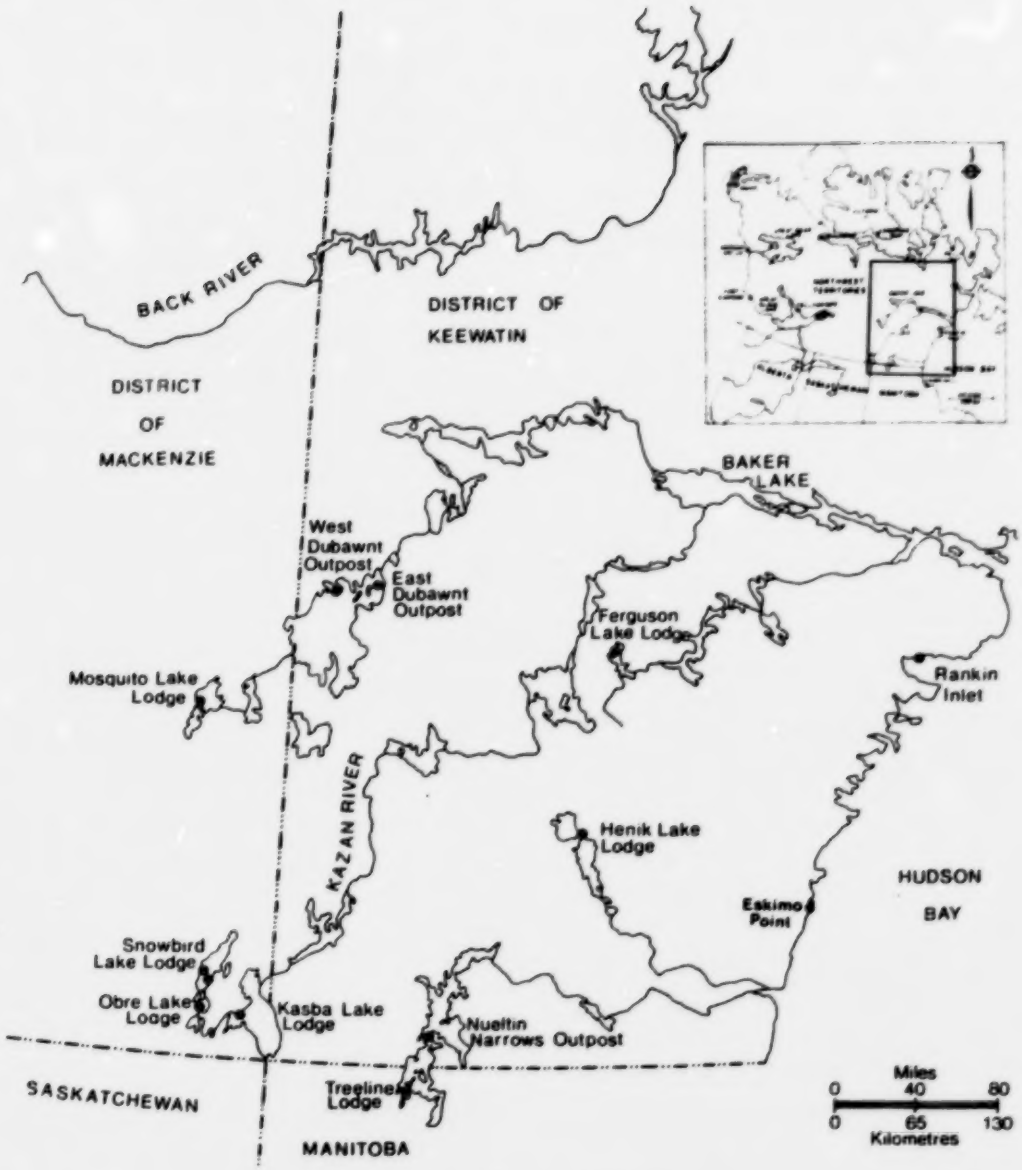


Fig. 1. Map of the District of Keewatin, Northwest Territories, showing the locations of sport fishing lodges and outpost camps.

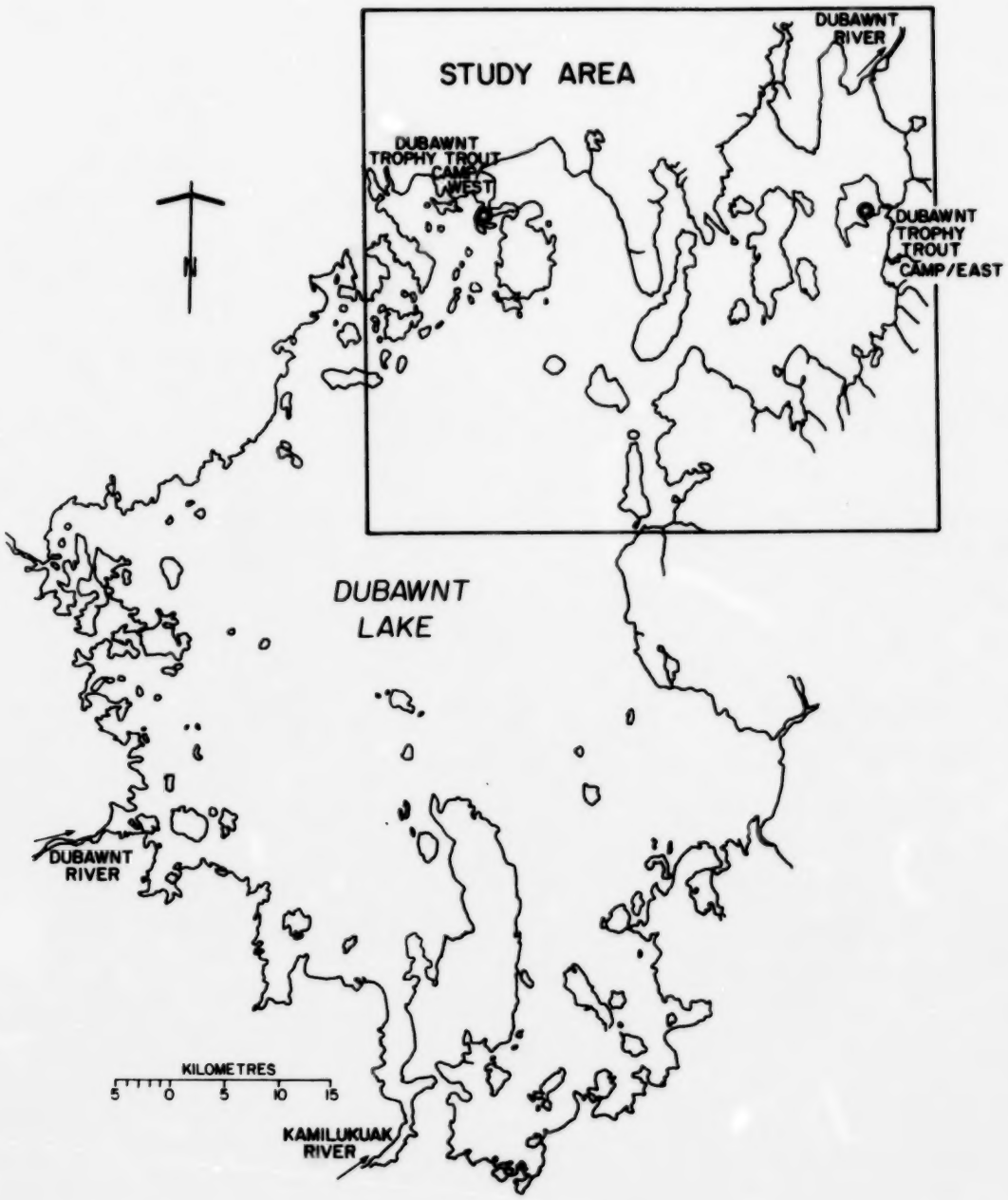


Fig. 2. Map of Dubawnt Lake showing the location of the outpost camps.

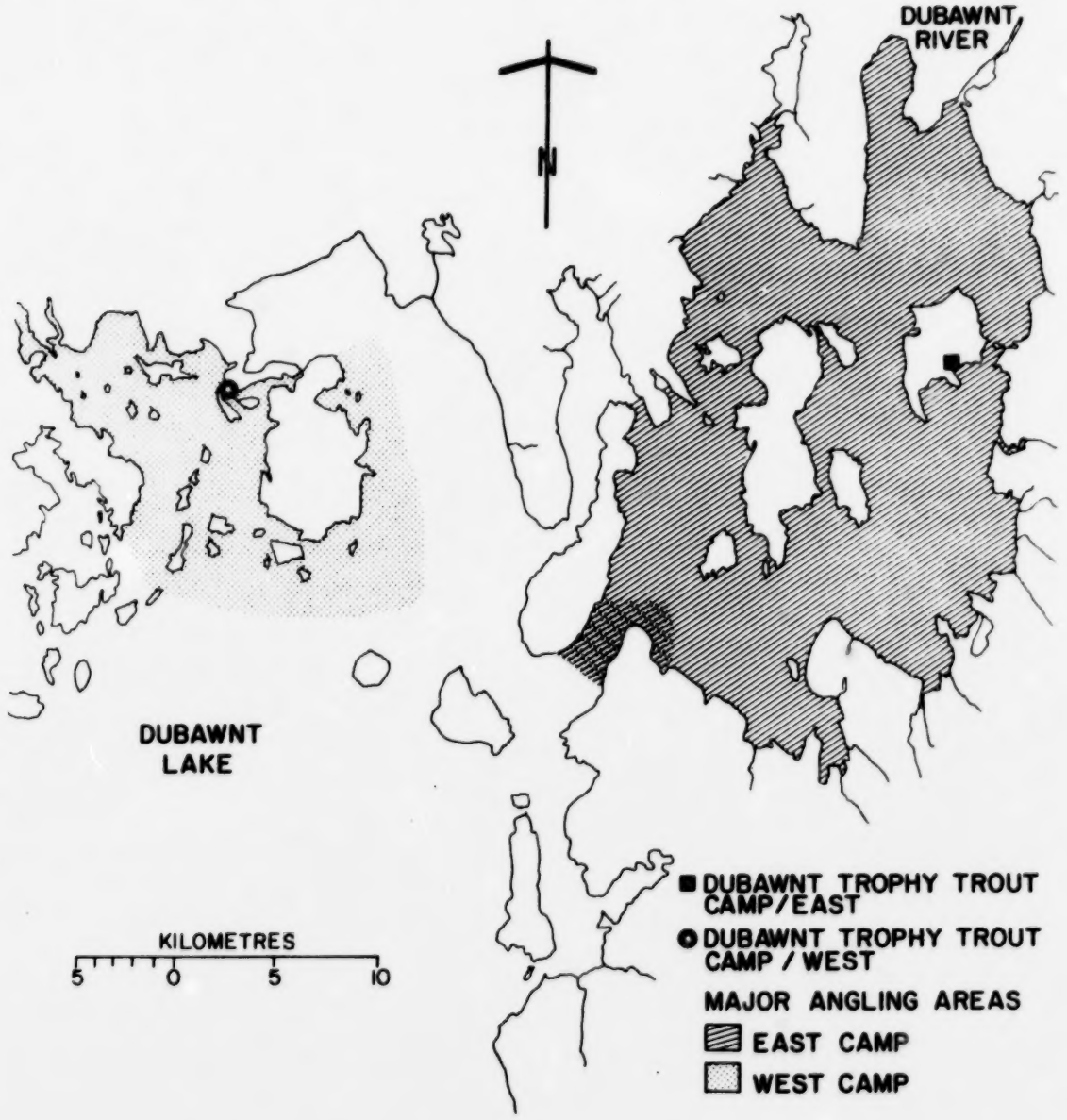


Fig. 3. Map of Dubawnt Lake showing the location of the outpost camps and the major angling areas.

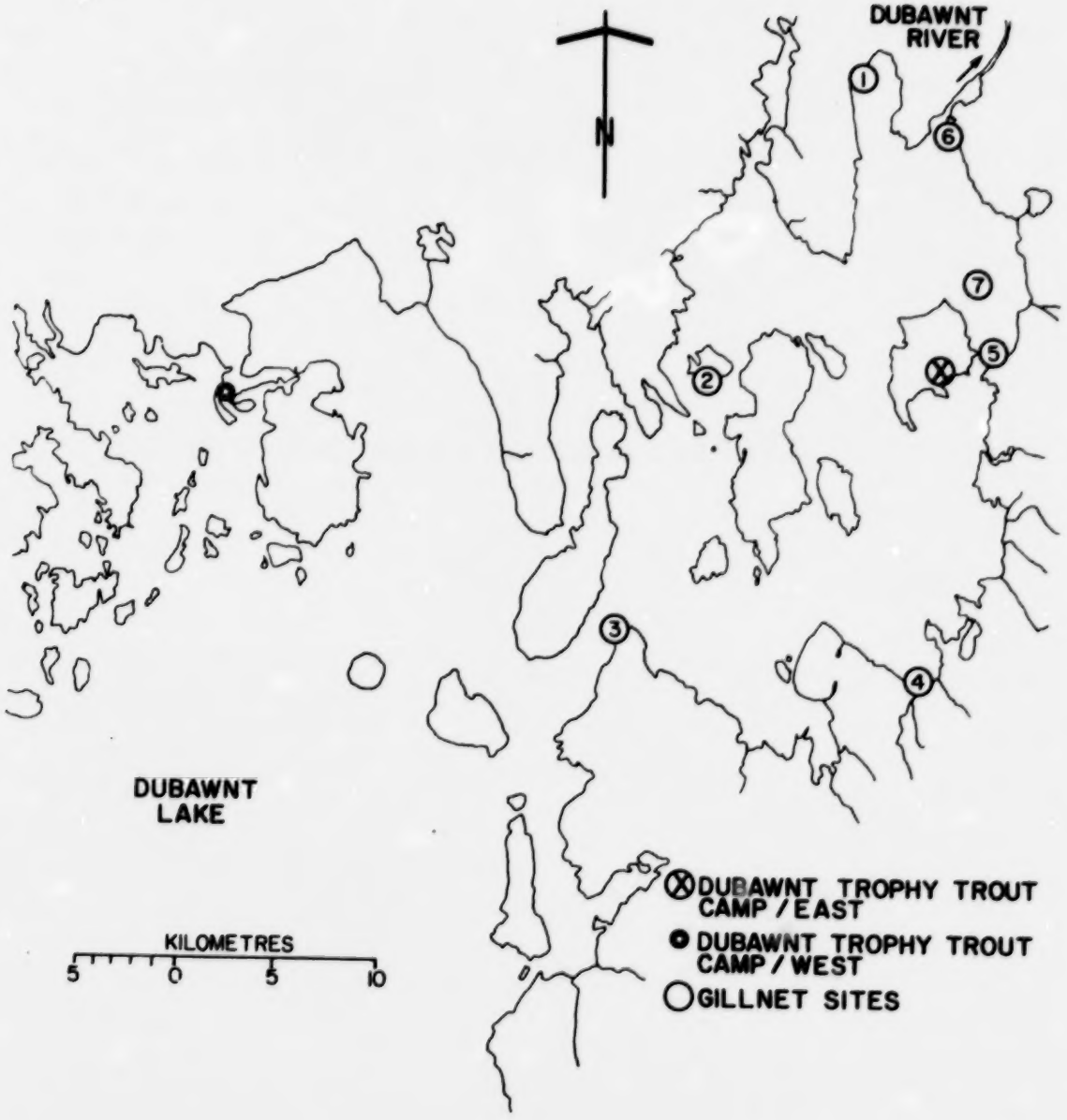
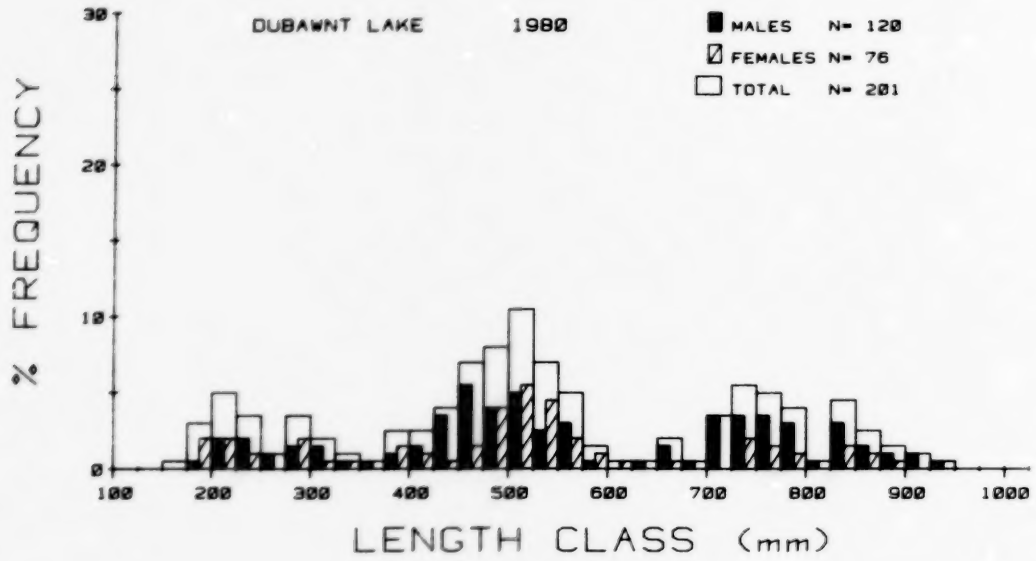


Fig. 4. Map of Dubawnt Lake showing the experimental gillnet locations for 1980.



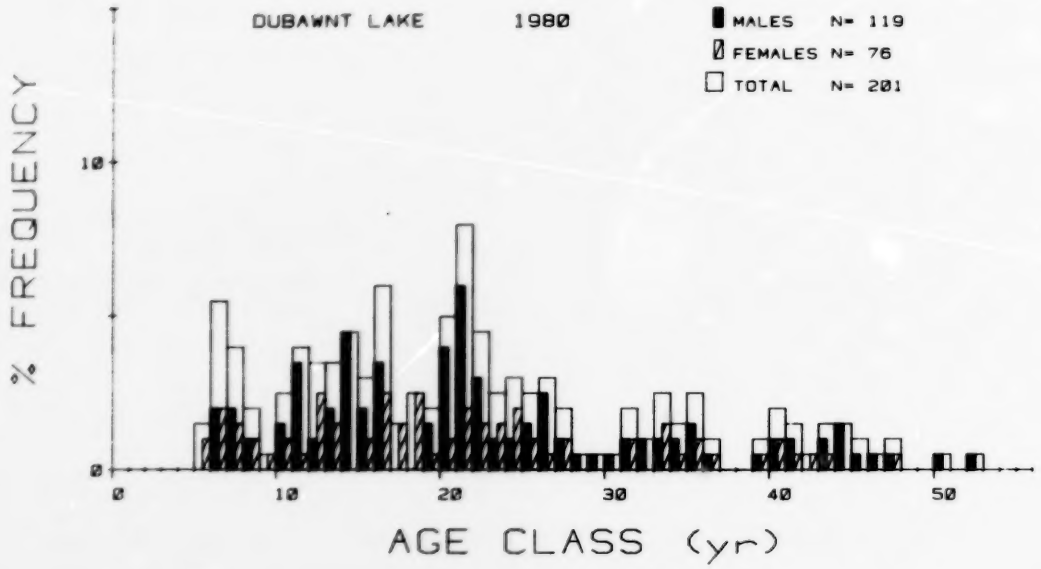


Fig. 5. Length and age frequency distributions for lake trout from Dubawnt Lake, 1980.

Appendix 1. Summary of information on sample dates, sample locations, set duration and catch per unit of effort for experimental gillnet sets on Dubawnt Lake, 1980.

Date	Set Number	Location Number	Set Duration (h)	Total Catch (kg)	CPE[1]
August 9	1	1	20.0	14	7.37
10	2	2	23.0	32	14.65
11	3	3	25.0	32	13.47
12	4	4	23.0	32	14.65
13	5	5	23.0	29	13.27
14	6	6	19.0	66	36.57
15	7	7	23.0	12	5.49

[1] No. fish caught/100 m gillnet/24 hours.

Appendix 2. Biological data by length interval for round whitefish caught by experimental nets from Dubawnt Lake,1959[1].

LENGTH INTERVAL (MM)	MALES N	%	LENGTH(MM) MEAN	WEIGHT(G) MEAN	SD	K	FEMALES N	%	LENGTH(MM) MEAN	WEIGHT(G) MEAN	SD	K	COMBINED N	%	LENGTH(MM) MEAN	WEIGHT(G) MEAN	SD	K	% FEMALE
190	-	-	-	-	-	-	1	3	198	70	-	0.90	1	1	198	70	-	0.90	-
200	1	3	201	70	-	0.86	2	5	205	70	0	0.81	3	4	204	70	0	0.83	67
210	1	3	210	75	-	0.81	1	3	216	80	-	0.79	3	4	213	82	8	0.85	50
220	2	7	223	95	7	0.86	5	14	224	94	4	0.83	9	13	224	93	4	0.83	71
230	2	7	235	103	4	0.79	-	-	-	-	-	-	2	3	235	103	4	0.79	-
240	1	3	249	130	-	0.84	-	-	-	-	-	-	1	1	249	130	-	0.84	-
250	2	7	254	138	11	0.84	1	3	254	130	-	0.79	3	4	254	135	9	0.83	33
270	1	3	276	190	-	0.90	2	5	274	153	88	0.74	3	4	275	165	66	0.79	67
280	-	-	-	-	-	-	1	3	287	210	-	0.89	1	1	287	210	-	0.89	-
290	2	7	297	263	18	1.01	-	-	-	-	-	-	2	3	297	263	18	1.01	-
300	3	10	305	257	16	0.91	7	19	304	264	13	0.94	10	14	304	262	13	0.93	70
310	3	10	316	300	25	0.95	1	3	316	350	-	1.11	4	6	316	313	32	0.99	25
320	3	10	325	312	13	0.90	4	11	325	338	14	0.98	7	10	325	326	19	0.95	57
330	4	14	330	366	14	1.02	5	14	333	360	29	0.97	9	13	332	363	22	0.99	56
340	2	7	345	363	18	0.88	5	14	343	410	38	1.02	7	10	343	396	39	0.98	71
350	1	3	351	400	-	0.92	-	-	-	-	-	-	1	1	351	400	-	0.92	-
360	1	3	368	500	-	1.00	2	5	365	438	53	0.90	3	4	366	458	52	0.93	67
TOTAL	29						37						69						
MEAN			294	254	117	0.91			294	261	129	0.92			291	251	125	0.91	56

[1] Moshenko, 1980.

Appendix 3. Biological data by age group for round whitefish caught by experimental nets from Dubawnt Lake,1959[1].

AGE (YR)	MALES N	%	LENGTH(MM) MEAN	SD	WEIGHT(G) MEAN	SD	K	FEMALES N	%	LENGTH(MM) MEAN	SD	WEIGHT(G) MEAN	SD	K	COMBINED N	%	LENGTH(MM) MEAN	SD	WEIGHT(G) MEAN	SD	K	% FEMALE
6	4	14	214	10.9	84	14	0.85	4	11	218	13.8	89	13	0.85	9	13	216	11.0	87	12	0.86	50
7	4	14	244	10.8	120	21	0.82	7	19	236	43.0	126	101	0.84	13	19	237	31.5	119	73	0.82	64
8	2	7	263	19.1	160	42	0.87	1	3	308	-	270	-	0.92	3	4	278	29.5	197	70	0.89	33
9	3	10	309	4.5	267	14	0.90	6	16	301	19.8	254	42	0.93	9	13	304	16.4	258	35	0.92	67
10	7	24	316	19.8	301	53	0.95	6	16	328	22.2	342	56	0.96	13	19	321	21.1	320	56	0.96	46
11	3	10	336	10.7	350	25	0.93	8	22	318	22.1	308	99	0.92	11	16	323	20.7	320	85	0.92	73
12	4	14	329	11.1	346	33	0.97	4	11	343	1.9	413	43	1.03	8	12	336	10.2	379	50	1.00	50
13	2	7	349	26.9	440	85	1.03	-	-	-	-	-	-	-	2	3	349	26.9	440	85	1.03	-
14	-	-	-	-	-	-	-	1	3	367	-	475	-	0.96	1	1	367	-	475	-	0.96	-
TOTAL	29							37							69							
MEAN			294	47.2	254	117	0.91			294	50.8	261	129	0.92			291	50.0	251	125	0.91	56
MEAN AGE	9.2																					

[1] Moshenko, 1980

Appendix 4. Biological data by length interval for longnose sucker caught by experimental nets from Dubawnt Lake, 1959[1].

LENGTH INTERVAL (MM)	MALES						FEMALES						COMBINED						
			LENGTH (MM)	WEIGHT (G)					LENGTH (MM)	WEIGHT (G)					LENGTH (MM)	WEIGHT (G)			%
	N	%	MEAN	MEAN	SD	K	N	%	MEAN	MEAN	SD	K	N	%	MEAN	MEAN	SD	K	FEMALE
150	-	-	-	-	-	-	-	-	-	-	-	-	2	4	157	45	0	1.16	-
160	2	9	164	53	4	1.20	-	-	-	-	-	-	2	4	164	53	4	1.20	-
170	-	-	-	-	-	-	1	6	177	60	-	1.08	2	4	178	60	0	1.07	-
180	-	-	-	-	-	-	2	11	185	70	0	1.11	2	4	185	70	0	1.11	-
250	1	4	256	210	-	1.25	-	-	-	-	-	-	1	2	256	210	-	1.25	-
260	1	4	262	220	-	1.22	-	-	-	-	-	-	1	2	262	220	-	1.22	-
280	1	4	281	290	-	1.31	-	-	-	-	-	-	1	2	281	290	-	1.31	-
290	1	4	292	300	-	1.20	-	-	-	-	-	-	1	2	292	300	-	1.20	-
300	2	9	300	338	18	1.25	-	-	-	-	-	-	2	4	300	338	18	1.25	-
330	2	9	335	500	0	1.34	-	-	-	-	-	-	2	4	335	500	0	1.34	-
340	1	4	343	525	-	1.30	1	6	349	550	-	1.29	2	4	346	538	18	1.30	50
350	1	4	355	625	-	1.40	-	-	-	-	-	-	1	2	355	625	-	1.40	-
360	5	22	365	670	41	1.38	-	-	-	-	-	-	5	11	365	670	41	1.38	-
370	2	9	375	625	0	1.19	-	-	-	-	-	-	3	7	373	642	29	1.24	-
380	2	9	383	700	0	1.25	1	6	383	750	-	1.33	3	7	383	717	29	1.28	33
390	1	4	398	775	-	1.23	1	6	395	750	-	1.22	3	7	394	775	25	1.26	50
400	1	4	402	1025	-	1.58	5	28	405	840	38	1.27	6	13	404	871	83	1.32	83
410	-	-	-	-	-	-	2	11	412	938	53	1.34	2	4	412	938	53	1.34	-
420	-	-	-	-	-	-	1	6	428	1000	-	1.28	1	2	428	1000	-	1.28	-
440	-	-	-	-	-	-	1	6	440	950	-	1.12	1	2	440	950	-	1.12	-
450	-	-	-	-	-	-	2	11	453	1275	71	1.38	2	4	453	1275	71	1.38	-
460	-	-	-	-	-	-	1	6	460	1275	-	1.31	1	2	460	1275	-	1.31	-
TOTAL	23						18						46						
MEAN			327	511	246	1.30			375	783	382	1.26			338	597	351	1.27	44

[1] Moshenko, 1980.

Appendix 5. Biological data by age group for longnose sucker caught by experimental nets from Dubawnt Lake, 1959[1].

AGE (YR)	MALES							FEMALES							COMBINED							
			LENGTH(MM)		WEIGHT(G)					LENGTH(MM)		WEIGHT(G)					LENGTH(MM)		WEIGHT(G)			
	N	%	MEAN	SD	MEAN	SD	K	N	%	MEAN	SD	MEAN	SD	K	N	%	MEAN	SD	MEAN	SD	K	% FEMALE
4	-	-	-	-	-	-	-	2	12	181	5.7	65	7	1.09	3	7	180	4.4	63	6	1.08	-
5	1	4	163	-	50	-	1.15	-	-	-	-	-	-	-	2	5	160	4.2	48	4	1.16	-
6	2	9	252	123.7	278	315	1.27	-	-	-	-	-	-	-	2	5	252	123.7	278	315	1.27	-
8	2	9	278	31.1	268	81	1.23	-	-	-	-	-	-	-	2	5	278	31.1	268	81	1.23	-
9	6	26	326	40.3	465	176	1.29	1	6	383	-	750	-	1.33	7	16	334	42.6	506	194	1.29	14
10	4	17	368	28.5	638	113	1.28	4	24	395	33.3	781	186	1.25	8	18	381	32.0	709	162	1.27	50
11	6	26	351	45.2	599	190	1.33	4	24	414	17.5	881	55	1.24	12	27	377	43.6	716	188	1.30	40
12	2	9	384	25.5	838	265	1.45	1	6	451	-	1225	-	1.34	3	7	406	42.7	967	292	1.41	33
13	-	-	-	-	-	-	-	3	18	425	31.2	1017	240	1.31	3	7	425	31.2	1017	240	1.31	-
14	-	-	-	-	-	-	-	1	6	411	-	900	-	1.30	1	2	411	-	900	-	1.30	-
16	-	-	-	-	-	-	-	1	6	454	-	1325	-	1.42	1	2	454	-	1325	-	1.42	-
TOTAL	23							17							44							
MEAN			327	66.6	511	246	1.30			386	82.0	825	348	1.26			345	84.6	622	339	1.28	43
MEAN AGE		9.8																				

[1] Moshenko, 1980.

POOR

QUALITY

ORIGINAL